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## CHARACTER-BUILDING CONTENT OF ARITHMETIC.

BY JENNY LIND GREEN.

Arithmetic was introduced into American schools to meet definite social situations of Colonial times. Although a fixed factor in the course of study, it has wandered far from its predestined course. Literally, we have seemed to stress addition, subtraction, multiplication and division at the expense of knowing what to add, subtract, multiply and divide. We have given the impression of emphasizing the fundamentals and their kindred abstractions to the extent of ignoring the fact that it is sometimes necessary for us to decide which of these desirable processes should be used. Sadder still, we have been accused of forgetting to mention in a functional way that one is likely to meet these fundamentals and mathematical accessories in the flesh, and clothed in raiment the like of which was never seen in text-book or classroom.

We recognize such criticisms as following in the wake of definite social interpretations of character-building.

*Education*, February, 1916, Ernest P. Carr: "Dr. Nicholas Butler says, 'That knowledge is of most worth which stands in closest relation to the higher forms of activity of that spirit which is created in the image of Him who holds the world in the hollow of His hand.' The world needs to have its eyes opened to live and not exist. The school must open its eyes."

The social meaning of character-building has characterized educational writing of the last decade. Judged by its standards a curriculum is character-building in content to the extent that it presents social situations with regard to the development of appreciation of the best work of the world and ability and inspiration to help it along.

The social meaning has revived and enriched the original values of arithmetic. Articles written during the last few years dealing with subject-matter and method of arithmetic have been

colored with the problem of how the subject can help children live. Studies published during the last two years show that attitudes and practices in our schools are more in harmony with social need. New texts afford striking evidence that arithmetic content is beginning to meet social demands.

The change in texts deserves more than mere mention. Publishers ordinarily avoid responsibility for texts not demanded by the public. They are not good investments. That a number of arithmetic texts of the type mentioned are on the market indicates that we may be somewhat assured of the beginnings of firmer foundations for carrying out a socialized program.

The extent to which the social situation has been made a determining factor in texts is shown in terminology, organization and problem content. A glance at chapter organization will suggest it.

Text typical of ten years ago:

Chapter organization:

- I. Processes with Integers.
- II. Common Fractions.
- III. Decimal Fractions.
- IV. Denominate Numbers.
- V. The Solutions of Problems.
- VI. Percentage.
- VII. Business Applications.
- VIII. Interest and Banking.
- IX. Powers and Roots.
- X. Mensuration.

Text published recently for use in the same grades:

Junior High School Mathematics—Wentworth, Smith, Brown.

Book I.

Chapter organization (only arithmetical phases are quoted):

- I. Arithmetic of the Home.
- II. Arithmetic of the Store.
- III. Arithmetic of the Farm.
- IV. Arithmetic of Industry.
- V. Arithmetic of the Bank.

## Book II.

Chapter organization (only arithmetical phases are quoted) :

- I. Arithmetic of Trade.
- II. Arithmetic of Transportation.
- III. Arithmetic of Industry.
- IV. Arithmetic of Building.
- V. Arithmetic of Banking.
- VI. Arithmetic of Corporations.
- VII. Arithmetic of Home Life.
- VIII. Arithmetic of Farming.
- IX. Arithmetic of Community Life.
- X. Arithmetic of Civic Life.
- XI. Arithmetic of Investments.
- XII. Arithmetic of Mensuration.

Terminology and organization of the older texts were determined by the abstract process. They contained some concrete problems. These however were few and far between and were not as a series cumulative to definite social ends appreciated by the pupil. The terminology and organization of the new text are largely determined by social needs. Problem content and its organization in the several chapters show the same influence.

The new texts stress three types of training :

1. Training to see social situations involving arithmetical relations.
2. Training to know what processes are essential to the arithmetical phase of social situations.
3. Training to use those processes economically.

All texts have stressed some of these values. Those published recently recognize the social situation as the determining factor.

Judging from such indications arithmetic is ridding herself of the barnacles accumulated on her voyages and is taking unto herself the general social content necessary to right living.

The content of arithmetic is functional to the extent that the arithmetical elements are presented in the natural settings. One rarely, if ever, meets as a social problem the necessity for combining 2 and 2. One may find it necessary to add 2 dollars and 2 dollars or 2 apples and 2 more apples. One is much more likely to meet such a need in combination with a number of other relations which add to its social significance.

The social situations of arithmetic sometimes involve ethical elements. The relation is often close. The arithmetic of trade has an inseparable companion in the ethics of trade. The arithmetic of trade had its development determined somewhat by ethical principles. The history of measurement affords illustration. The ethics of keeping accounts, paying bills promptly, etc., bear closer relation to arithmetic than to any other subject-matter in that they occur together oftener in the same social situation. The ethics of thrift is not separate in conduct from the arithmetic of thrift. There are certain types of ethical principles which are a part of social situations of arithmetic.

These ethical principles are important. The stress of moral problems to which we are being rudely awakened in the present international crisis forces to attend to them. It asks us such questions as these: Is it of great value to the world that individuals should know how to calculate their economic benefits of trade without an appreciation of how that trade affects the good of the mass? Is it of particular value that our children are able to balance accounts if they do not have that ethical appreciation which should govern their expenditures? In general, is it good that present and succeeding generations should be trained to know what to do in meeting the arithmetic of situations and not be trained in the right conduct involved?

A forecast of a type of ethical values of arithmetic is seen in recent discussions of thrift.

*Child Welfare Bulletin*, 1918: "Thrift as a matter of self-preservation should be taught in school and at home. Its value not only economically but morally is of the greatest moment."

*N. E. A. Bulletin*, 1917: "Thrift is a patriotic duty. The nation of to-day is learning the economic necessity of thrift, but the nation of to-morrow must know the educational necessity of this virtue."

Such quotations are typical of many made by both laymen and educators. A supplementary arithmetic suggestive of ethical relations of this special type is that of Superintendent Farmer, of Evanston, Illinois. It is published by Ginn & Co. It emphasizes food conservation.

The public is awake to a pressing need for the kind of ethical training arithmetic might afford. That it should be given in

connection with arithmetic is evident in that its principles are more closely related to the subject-matter of arithmetic than to any other special subject-matter. If such ethics should be a part of any special subject it should be a part of arithmetic.

The open question is, should it be a part of any special subject, or should it be apart from all other types of relations?

As a matter of fact nearly every conceivable plan for teaching ethics is being tried at present—a frank confession of past failures. There was a time when we felt that history might solve such of its problems as needed to be taught in school. A study of state courses shows that the study of civics is expected to function definitely in that respect. This is evident in the statements of aims.

A questionnaire to which twenty-two of our large cities responded shows fifteen statements of aims attaching moral significance to civics study.

*Entire list of cities:* Memphis, Pittsburgh, Seattle, Carson City, Philadelphia, Boise, St. Paul, Birmingham, Little Rock, Chicago, Syracuse, New York City, Washington, D. C., Richmond, Spokane, Nashville, Columbus, Los Angeles, Cincinnati, Jacksonville, Baltimore, Santa Fe.

Fourteen of the group of fifteen believed that some civic material should be taught in connection with the subjects to which it is most closely related. Statements of practices in correlation were given. These practices varied widely. They ranged from correlations with literature only to correlations with all of the usual elementary-school subjects with the exception of arithmetic.

Ten of the group stated that some practical work was done with local community problems.

Such attitudes and practices seem to indicate the following:

1. That ethical training of the past has not proved satisfactory.
2. That ethical values are still linked somewhat with the study of civics.
3. That there is a decided tendency to break up this civics unit as a separate unit and use it in connection with subject-matter closely related to it.

That the tendency to correlate material has not already carried civics over into arithmetic is partly explained in the fact

that civics courses have not, as a rule, included the ethics of arithmetic. Society has not demanded it.

Society has demanded an education that prepares for life. One response to the demand has been a more socialized content of arithmetic. To-day society is conscious of a type of ethical appreciation essential to her welfare, which the school has not given. This ethics belongs to arithmetic. Past experiences and present tendencies in ethics teaching show that the road is "open."

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